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Blueprint for the development of low carbon society scenarios for Asian regions- case study of Iskandar Malaysia

Blueprint for the development of low carbon society scenarios for Asian regions- case study of Iskandar Malaysia

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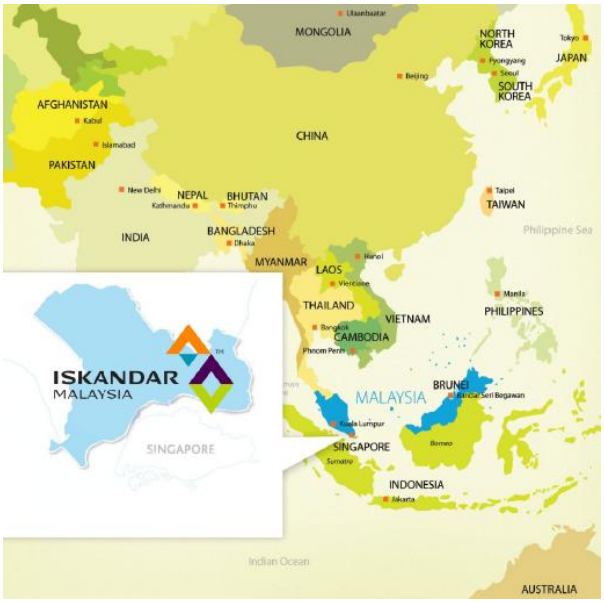
Abstract. Malaysian government aims to reduce 40% reduction of carbon emission intensity by the year 2020 using 2005 as the base year. Several mitigation and adaptation strategies in addressing environmental and climate change are formulated at national, regional and local level to mitigate greenhouse gases. This paper aims to examine local and regional resilient policy actions to reduce greenhouse gases using the empirical case of Iskandar Malaysia. The study case is selected because it is one of the fast developing economic corridor regions in Malaysia. In this study, a low carbon society blueprint is initiated to guide the rapid development of this economic corridor towards low carbon green growth. The blueprint provides the sustainable green growth roadmap with major 12 actions for the region. It is done through a bottom-up approach where stakeholder discussions are carried out to allow local communities participation in the plan formulation.

1. Introduction

In the era of sustainability, addressing climate change had been growing as one of the imperative concern for every city government. Cities are the main contributors to greenhouse gases (GHGs) emission and susceptible to global warming. Cities with increasing population growth and continuous economy development consuming vast resources generating enormous waste are producing a large volume of GHGs. Many cities predominantly in developed countries today have established action plan and roadmap to tackle climate change issue. However, the main challenge lies on cities in developing nations; which are vulnerable to climate change. In particular for the cities of developing nations in Asian regions with including Malaysian cities, whereby the urban population increase is high, economy growth is rapid and climate change is new for them. There is still lack of knowledge to tackle on implication of climate change and GHG baseline study methodology at the city level. In line with the Malaysia Government's aspiration for low emission development path and good global citizenship in combating climate change, Iskandar Malaysia (IM) as the first region in Malaysia has initiated climate change blueprint in ensuring the climate resilient development for sustainability. This paper provides an insight on the carbon mitigation roadmap in IM. Hopefully the benefit of this paper is not limited to other Malaysian cities solely as the substantial findings will be disseminated towards other cities in Asian countries.

2. An Overview on Iskandar Malaysia

Iskandar Malaysia is a visionary economic region in Johor that was established in 2006 as one of the catalyst development corridors to spur growth of the Malaysian economy. It has an area of 2,216.3 km^2 and it is the largest single development project ever to be undertaken in Southeast Asia. Strategically located at the southern-most tip of Mainland Asia to tap on a vast market of about 1 billion people within a 6-hour flight radius (Figure 1), IM is set to become an integrated global node that synergises with growth of Singapore and Indonesia. To that end, it has been projected that population in the urban region will more than double from 1.35 million in 2005 to over 3 million by 2025 and GDP will almost quadruple from MYR35.7 billion to MYR141.4 billion over the same period (Khazanah Nasional, 2006). Geographically, IM covers the entire Districts of Johor Bahru and Kulaijaya and several sub-districts of Pontian, comprising five local authorities. Being rapid developing region, it possesses the great opportunity incorporating good governance and low carbon mitigation policies into the urban structure of this developing region. Developed cities are rather saturated and high carbon locked hence, it is found to be difficult and more expensive to retrofit.



	2005	2025	2025 /2005
Population (1000)	1,353	3,000	2.22
Household (1000)	303	706	2.33
GDP (Bill. RM)	35.7	141.4	3.96
Gross output (Bill. RM)	121.4	438.9	3.61
Primary industry	1.5	2.4	1.59
Secondary industry	86.2	274.0	3.18
Tertiary industry	33.7	162.5	4.82
Passenger transport demand (Mill. passenger-km)	9,565	59,524	6.22
Freight transport demand (Mill. ton-km)	8,269	26,054	3.15

Figure 1. Location and socio-economic scenarios of Iskandar Malaysia (Source: Iskandar Regional Development Authority, 2010)

3. Low Carbon Society Blueprint for Iskandar Malaysia 2025

The Iskandar Malaysia Low Carbon Society Blueprint 2025 (IMLCSBP 2025) is a written document that presents comprehensive climate change mitigation policies (carbon emission intensity reduction actions and sub-actions) and detailed strategies (measures and programs) to guide development of IM towards achieving its vision of 'a strong, sustainable metropolis of international standing' by 2025. The integration of two competing goals – 'strong' and 'sustainable' – in a single development vision poses great challenges to IM's growth policies and development planning. On one hand, the urban region needs to develop a prosperous, resilient, robust and globally competitive *economy* (the 'strong' dimension); on the other (the 'sustainability' dimension), it needs to nurture a healthy and knowledgeable *society* that subscribes to low carbon living and at the same time develop a total urban-regional *environment* that enables rapid economic growth but reduces growth's energy demand and carbon emission intensity. This calls for a holistic and integrated approach, involving policies and strategies on *Green Economy*, *Green Community* and *Green Environment*, to decouple rapid growth from carbon emission in IM. Meeting this challenge has been the primary goal and underlying philosophy of the IMLCSBP 2025. Essentially, the Blueprint comprises two principal components: 1)

narrative on growth scenarios, policies, measures and programs to achieve a minimum targeted 50% reduction in carbon emission intensity by 2025 based on the 2005 level; 2) scenario-based modelling and projection of carbon emission reductions achievable.

It was the outcome from unique social inclusive approach between experts, policymakers and communities. The scientific inputs from multidisciplinary local and foreign researchers cum feedbacks from local communities and policymakers are considered in the crafting of blueprint. A series of stakeholder discussions were held by the research team with residents, industries, business communities, local municipalities, public agencies and non-governmental organizations in the process of policy making for blueprint. The public consultations ensure the gap of science and policy making being minimize and the blueprint will be feasible in term of socio-political context and effective implementation.

4. Twelve Actions Transforming Climate Resilient Iskandar Malaysia

The greenhouse gases (GHGs) emission for Iskandar Malaysia in year 2005 is estimated to be 11.4MtCO_2eq and this is projected to triple to 31.3 MtCO_2eq in year 2025 business as usual (Bau) scenario. With the introduction of the 12 countermeasures from the blueprint, increment of GHGs emission has been slowed down, and it is expected to be 18.9 MtCO_2eq for year 2025 countermeasure (CM) scenario. These twelve possible mitigation options that capable to lower carbon emission for the case of Iskandar Malaysia are; (i) Integrated green transportation, (ii) Green industry, (iii) Low carbon urban governance, (iv) Green building and construction, (v) Green energy system and renewable energy, (vi) Low carbon lifestyle, (vii) Community engagement and consensus building, (iix) Walkable, safe and livable city design (ix) Smart urban growth, (x) Green and blue infrastructure and rural resources, (xi) Sustainable waste management and (xii) Clean air environment (Table 1). Action 5- Green energy system and renewable energy, Action 6- Low carbon lifestyle and Action 1- Integrated green transportation are the higher priority strategies to cut carbon emission significantly. They are comprised of 57% of total emission reduction. These three actions should have more attentions by policymakers. Action 3- Low carbon urban governance and Action 7- Community engagement and consensus building does not have any direct contribution yet they are vital in the creation of low carbon society development in Iskandar Malaysia.

Table 1. Carbon reduction contribution of 12 mitigation strategies for low carbon Iskandar Malaysia

Actions	Contribution * ($ktCO_2eq$)	Share
Green Economy	**6,937**	**54%**
Action 1 Integrated Green Transportation	1,916	15%
Action 2 Green Industry	1,094	9%
Action 3 Low Carbon Urban Governance **	-	-
Action 4 Green Building and Construction	1,203	9%
Action 5 Green Energy System and Renewable Energy	2,725	21%
Green Community	**2,727**	**21%**
Action 6 Low Carbon Lifestyle	2,727	21%
Action 7 Community Engagement and Consensus Building**	-	-
Green Environment	**3,094**	**24%**
Action 8 Walkable, Safe and Livable City Design	263	2%
Action 9 Smart Urban Growth	1,214	10%
Action 10 Green and Blue Infrastructure and Rural Resources	392	3%
Action 11 Sustainable Waste Management	1,224	10%
Action 12 Clean Air Environment**	-	-
Total	**12,758**	**100%**

*Contribution to GHG emission reduction from 2025BaU to 2025CM ** Action 3, 7 and 12 does not have direct emission reduction, but their effect is included in other Actions. *** Since contribution of Action 10 includes carbon sink by forest conservation and urban tree planting, the total of contribution of the 12 Actions is greater than difference of the GHG emissions between 2025BaU and 2025CM.

5. The Way Forward

During the formulation of the Low Carbon Society Blueprint of Iskandar Malaysia, there is an ever presence of "policy-science gaps" in terms of time-scale (e.g. long-term versus short-term gains), priority (e.g. economic feasibility and budgetary concerns over social and ecological impacts) and practical considerations (e.g. institutional capacity and human capital to translate research into policy) between policymakers and researchers. While not all gaps are able to be patched as well as intended, it is learned that having policymakers onboard the research team helps significantly in identifying these issues early on and in finding middle grounds. Further understanding needs to be gained to identify processes and factors that lead to prevalent uptake of evidence-based policy recommendations within specific contexts.

Effective communication of research evidences is vital; research evidences need to be communicated in languages readable to policymakers. Furthermore, proposed policies need to "appeal" to policymakers through, among others, identification of "quick win" and "low-lying fruits" programs; outlining of direct implementation, resource allocation and benefit/cost implications; and showing of sensitivity to institutional capacity and needs.

Last, it is found that "disciplinary gaps" exist even among academic researchers from different professional (e.g. social science versus pure science and engineering) and academic-cultural backgrounds. While these are virtually inevitable, it is found that working over disciplinary gaps gives rise to perspectives and solutions that otherwise would not be thought of.

Acknowledgement

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